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# ADDENDUM to ITG Trunk 2.0/ISDN NTP (Standard 1.00)

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## Meridian Integrated IP Telephony Gateway (ITG) Trunk 2.0 ISDN Signaling/24 Port: Description, Installation, and Operation (553-3001-202)

*Read the following information before you read the Nortel Networks Technical Publication (NTP).*

*For complete information on Meridian 1 ITG Trunk 2.0/ISDN Signalling Link (ISL), refer to Meridian Integrated IP Telephony Gateway (ITG) Trunk 2.0 ISDN Signaling/24 Port: Description, Installation, and Operation (553-3001-202).*

### Overview

This Addendum describes an enhancement to the Meridian 1 ITG Trunk 2.0 application which supports the ISDN Signalling Link as described in *Meridian Integrated IP Telephony Gateway (ITG) Trunk 2.0 ISDN Signaling/24 Port: Description, Installation, and Operation (553-3001-202)*. The enhancement adds a new ITG Trunk 2.1 card hardware platform to the existing ITG Trunk 1.0 and ITG Trunk 2.0 hardware platforms. Refer to appendix B for ITG hardware platform/application line up.

The ITG Trunk 2.1 card provides the following enhancements:

- single slot implementation in an Intelligent Peripheral Equipment (IPE) shelf for large and small systems.
- support for up to 32 channels for each card

## Description

The ITG Trunk 2.1 card is based on a new integrated hardware platform that delivers a single slot ITG solution, with an increase in port density from 24 ports (ITG 2.0) to 32 ports (ITG 2.1). The 32 port ITG Trunk 2.1 card is shown in Figure 1 on page 4. The base hardware (known as the Media Card) provides the hardware platform for many of Nortel Network's Enterprise applications developments. The ITG Trunk 2.1 enhances cabling arrangements for installation and maintenance.

### Assembly description

The ITG Trunk 2.1 card comes as a base Media Card platform with a DSP module installed, and with the ITG 2.1 application software installed on the C:/ drive.

**Note:** For multiple ITG Trunk card installation, Nortel Networks recommends provisioning the cards in separate IPE shelves and sharing trunk units between the cards.

### Faceplate indicators and interfaces

The ITG Trunk 2.1 card has a single slot metal faceplate. It uses shortened lock latches to lock it in place. Refer to Figure 1 on page 4.

#### Status LED

A single red LED indicates the enabled/disabled status of the card, and the status of the power-on self-test.

**Note:** Where a D-CHIP PC Card is installed in the ITG Trunk 2.1 card A:/ drive, the LED does not indicate the status of the D-CHIP PC Card or the D-CHIP.

#### Reset button

The reset button allows the operator to manually reset the card without cycling power to it. Use the reset button to reboot the card after a software upgrade, or to clear a fault condition.

#### PC Card (PCMCIA) Slot

This slot (designated as Slot A:) accepts a Type I or II PC Card. It also supports a D-CHIP interface PC Card (D-Chip) to the M1 system through the NTMF29Bx cable.

**Ethernet activity LEDs**

The LEDs indicate 100BaseT, 10BaseT and activity on both the ELAN and TLAN links.

**Maintenance Hex display**

The four-digit LED hexadecimal display provides an indication of the fault conditions. It also provides the status of the card in a particular configuration. Refer to Appendix A on page 27 for a complete list of hex display codes.

**RS232 maintenance port**

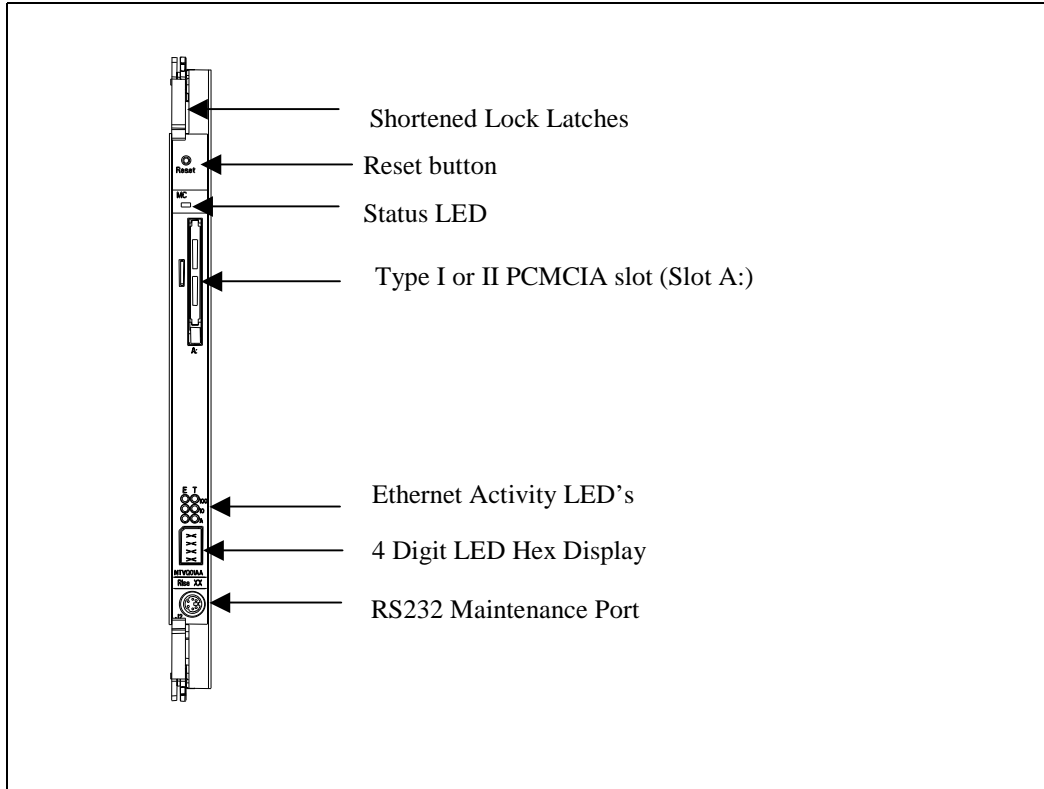
A mini-DIN socket provides access to the RS232 maintenance port (DCE) on the card.

**Backplane interfaces**

The ITG Trunk 2.1 card provides the following interfaces on the backplane connector:

- DS-30X voice/signalling
- Card LAN
- One RS232 serial COM port for the Command Line Interface (CLI)
- 10BaseT ELAN and 10/100BaseT TLAN Ethernet ports

**Figure 1**  
**ITG Trunk 2.1 card faceplate**



## System requirements

The ITG Trunk 2.1 card requires Release 25.00 software (or later) and MAT 6.6/OTM 1.0 (or later) system software for OA&M.

*Note:* The OTM 1.0 or MAT 6.6 applications must be ordered separately.

The following are also required:

- The NTVQ81 package which includes the D-CHIP. If additional packages are needed on the same node, order the NTZC45 package which does not include the D-CHIP.
- Both small and large systems packages which contain the 32-port ITG card with voice/fax Codec support.

*Note:* The small system package does not support UIPE functionality (for example: QSIG), therefore only MCDN is supported.
- The OTM/MAT Alarm Management Module is required to enable receipt of SNMP alarms from the ITG Trunk card.
- In NTVQ80, NTWE04AD is a one-foot cable. NTWE04AC is a ten-foot version of this cable and can be ordered separately for intra-cabinet connections.
- If the distance between the IPE shelves and the CE shelf (holding the D-CHIP interfacing MSDL card) is greater than six feet, use the following cables:
  - When the IPE shelves are in the same column as the CE shelf, the NTND26AA cable can be replaced by the NTND26AB cable.
  - When the IPE shelves are in separate columns from the CE shelf, the NTMF04BA extension cable can be used with the NTND26 cable.
- An unused D-CHIP port on the SDI/D-CH (NTAK02 or later) card for Option 11C, or on the MSDL card (NT6D80 or later) for large systems, is required.
- Software package requirements are as follows:
  - Basic Alternate Route Selection (BARS) or Network Alternate Route Selection (NARS) package 57 or package 58
  - ISDN Base (ISDN) package 145
  - ISDN Signaling Link (ISL) package 147
  - MSDL 222 (large system requirement)
  - QSIG Interface (QSIG) package 263 (large system optional)
  - QSIG GF Transport (QSIG GF) package 305 (large system optional)

## OTM 1.1 changes

The OTM 1.1 contains the following ITG Trunk 2.1 enhancements:

- The addition of a 32-port option to the Card Density selector on the Configuration tab of the Node Properties window.
- The addition of a 128ms option to the Echo Canceller tail-length selector on the DSP Profile tab of the Node Properties window. If this setting must be changed, contact your Nortel Networks technical group.

## Hardware components

The following hardware components are included in the ITG Trunk 2.1 package.

**Table 1**  
**ITG Trunk 2.1 packages (Part 1 of 2)**

Component	Product code
<p>ITG 2.1 Trunk Small and Large Systems Packages</p> <p>The package includes:</p> <ul style="list-style-type: none"> <li>• NT0961BA - ITG Trunk 2.1 card</li> <li>• NTVQ83 ITG EMC Shielding Kit</li> <li>• NTAG81 PC Maintenance cable</li> <li>• NTAK19 Shielded 4-port SDI/DCH cable for NTAK02 card</li> <li>• NTND26 DCHI Interface cable for MSDL</li> <li>• NTCW84 M1 Backplane to 50-pin I/O Panel Mounting connector with ITG specific filtering</li> <li>• 50-pin I/O connector - A0852632</li> <li>• NTVQ80 D-CHIP kit for ITG2.1 which includes the following; <ul style="list-style-type: none"> <li>- NTWE07AA C7LIU D Channel PCMCIA PC Card,</li> <li>- NTMF29BA D-CHIP to SDI card assembly cable.</li> <li>- NTWE04AD Inter Cabinet cable (1 ft),</li> <li>- Support Bracket Retaining Cable and screws.</li> </ul> </li> <li>• NTVQ61 ITG Trunk 2.1 NTP CD-ROM</li> </ul>	NTVQ81

**Table 1**  
**ITG Trunk 2.1 packages (Part 2 of 2)**

Component	Product code
<p>ITG 2.1 Trunk Small and Large Systems Packages without DCH PC card and NTP</p> <p>This package includes:</p> <ul style="list-style-type: none"> <li>• NT0961 ITG Trunk 2.1 card</li> <li>• 50-pin I/O connector - A0852632</li> <li>• NTCW84 M1 Backplane to 50-pin I/O Panel Mounting connector with ITG specific filtering</li> <li>• NTVQ83 ITG EMC Shielding kit.</li> </ul>	NTZC45

## Guidelines

Use the following guidelines for the installation of the ITG Trunk 2.1 card.

- Release 25.00 software must be installed and running
- The Alarm and Notification application package must be ordered separately.
- The SDI/DCH NTAK02BB card (small systems) or the MSDL NT6D80 card (large systems) for all MCDN features is required as described in the ITG 2.0 NTP. If not present, these cards must be ordered for each system.
- If the customer's large system includes the NT8D81AB moulded Tip/Ring Backplane cable, the NT8D81AA non-moulded version must be procured as a replacement for 100BaseT operation as the NTCW84JA new filter block is required. For complete information on installation of the new filter block, refer to *Meridian Integrated IP Telephony Gateway (ITG) Trunk 2.0 ISDN Signaling/24 Port: Description, Installation, and Operation* (553-3001-202).
- A security dongle and keycode mechanism are not required on the ITG Trunk 2.1 card.

- The new Option11C door and grill (which allows more space between the door and the cards) is required due to the space needed by the D-CHIP faceplate assembly. An upgrade kit, NTDK18, is also available.
- The number of ITG Trunk 2.1 cards that can be installed in an IPE Cube (large system) for Class B compliance (EN55022:1998 and EN55024:1998), is limited to 10. There are no limitations on the number of ITG Trunk 2.1 cards that can be installed in other Meridian 1 Systems.

## Applicable systems

The ITG Trunk 2.1 card resides in any Intelligent Peripheral slot in any of the following Meridian 1 systems running Release 25.00 or later software:

- Option 11C
- Option11C Mini
- Options 51C, 61C, 81, 81C

## Software delivery

The ITG Trunk 2.1 software application is provided on the pre-installed onboard CFlash ATA memory card.

## Software upgrade

The ITG Trunk 2.1 software application can be upgraded for enhancements or bug fixes in two ways: by FTP from OTM/MAT or from a PCMCIA card. The upgrade procedure is the same as the upgrade procedure for the ITG 2.0 for information on the ITG 2.0 upgrade procedure, see *Meridian Integrated IP Telephony Gateway (ITG) Trunk 2.0 ISDN Signaling/24 Port: Description, Installation, and Operation* (553-3001-202).

**Note:** The application (exec) file for the ITG Trunk 2.1 card contains a different CPU type definition from other ITG card types. When an ITG node containing a mixture of ITG 2.1, ITG 2.0 and ITG 1.0 Trunk cards, performs a node upgrade from OTM/MAT, each card type must be upgraded with its corresponding image file.



Download the latest software upgrade information from the Nortel Networks website, to the OTM/MAT workstation or to an FTP server. Go to [www.Nortelnetworks.com](http://www.Nortelnetworks.com) and follow the links through Customer Support and Software Distribution.

When the upgrade file has been downloaded, follow the same application software upgrade procedure as described in *Meridian Integrated IP Telephony Gateway (ITG) Trunk 2.0 ISDN Signaling/24 Port: Description, Installation, and Operation* (553-3001-202), to install the new ITG 2.1 application software onto the ITG Trunk 2.1 card.

## Replacing a faulty CFlash PC Card (C:/ drive)

While the ITG 2.1 Trunk software application execution program resides on the C:/ drive, the Compact Flash or CFlash card must not be removed or replaced unless the card is faulty; for example, if it is corrupted and cannot be reformatted. The ITG Trunk 2.1 card currently supports 16MB CFlash (a SanDisk CFlash product).



### WARNING

The ITG 2.1 Trunk does not require file transfers to or from the A:/ drive for normal operation. If an ATA card is to be used for file transfers to or from the A:/ drive, to C:/ drive or otherwise it is recommended that the ATA card be formatted on the ITG Trunk 2.1 card before use.



### CAUTION

When replacing the CFlash, contact the Nortel Networks Technical Support Centre as there are a number of considerations.



#### **CAUTION WITH ESDS DEVICES**

Use ESDS precautions when handling the ITG Trunk 2.1 card.



#### **WARNING**

Be sure to remove the ITG Trunk 2.1 card from the system before replacing the CFlash ATA card.

If it is necessary to remove the CFlash card, follow Procedure 1 on page 10.

#### **Procedure 1**

##### **CFlash Card Removal**

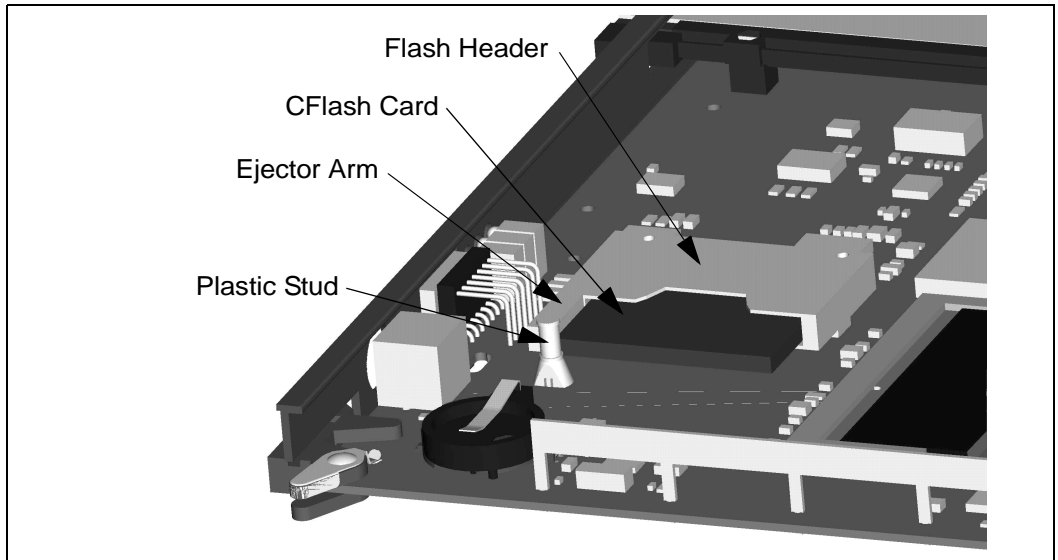
- 1 Place the ITG Trunk 2.1 card horizontally on a clean bench with the CFlash card facing up. Locate the parts shown in Figure 2 on page 11.
- 2 For easy access, use your hands (no metal tools), to rotate the plastic stud so one of the clips on the plastic stud faces an open space, then press inward on the clip to click it out of the lock position.
- 3 While keeping the first side unlocked, rotate the plastic stud by 180 degrees, then press the second side of the plastic stud to fully unlock it.
- 4 Remove the plastic stud, but retain it to reinsert when reassembling the card.
- 5 Use the ejector arm to remove the CFlash card.

————— *End of Procedure* —————

**WARNING**

The ITG Trunk 2.1 card requires the ITG 2.1 application software (exec file) to be on the C:/ drive (CFlash card) to run the application.

**Figure 2**  
**Flash card**



## Interoperability with earlier versions of ITG trunk

When ITG Trunk 2.1 cards are implemented in existing networks with nodes comprised of ITG 2.xx, Release 19 or earlier, fax calls do not work because of protocol incompatibility. Voice calls between ITG 2.1 and ITG 2.0 or ITG 1.0 operate without restrictions.

**Note:** If an upgrade from ITG 2.xx, Release 19 or earlier is projected to take several days and fax support is needed during this time, first upgrade the individual nodes to version ITG 2.xx Release 23. When the network is upgraded to ITG 2.xx Release 23, upgrade again to the latest software release. The interim upgrade step is only required if fax support is needed during the upgrade process.

## Fax Tone Detection Configuration

The V.21 Tone detection must be checked within the OTM1.1/MAT configuration tab for ITG Trunk 2.xx Release 25 fax operation.

## Cabling

### ELAN and TLAN interfaces

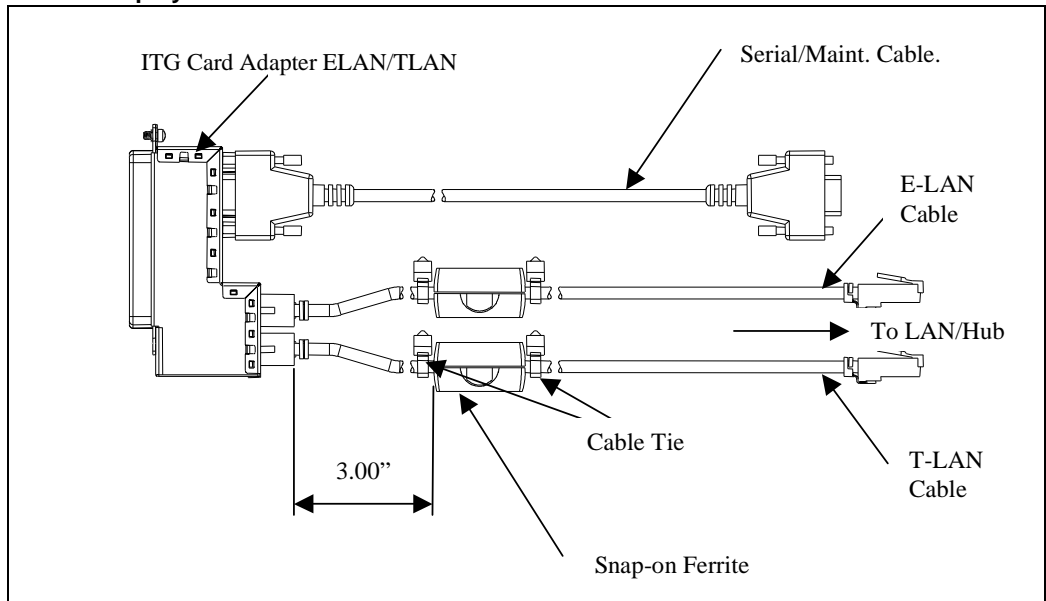
The ITG Trunk 2.1 card supports a single connector solution for access to the TLAN and ELAN Ethernet Ports. This ITG Card Adapter ELAN/TLAN solution replaces the ITG Trunk 2.0 product which requires a single ‘octopus’ cable. The ELAN supports 10BaseT operation and the TLAN supports 10/100BaseT operation. To support the 100BaseT operation on Meridian 1 large systems the TLAN interface requires specialized I/O panel mounting connectors. These replace the standard connectors provided on the Meridian 1 system.

Cables and connectors for the ELAN and TLAN interface functions include:

- the NTCW84JA Meridian 1 large system I/O panel filter block
- the ITG Card Adapter ELAN/TLAN, for use with both D-Chip and non-D-Chip equipped cards. Standard shielded, CAT-5 LAN cables (<100 meters) are recommended to attach the LAN ports to the local network.

An ITG EMC shielding kit (NTVQ83) must be installed on the ELAN and TLAN interface cables to meet regulatory requirements at the installation site. As shown in Figure 3 on page 13, a ferrite must be placed on both the ELAN and TLAN ethernet cables during installation. Cable ties are then placed to retain the ferrites in the correct position. This applies to small and large systems.

**Figure 3**  
**EMC Kit Deployment**



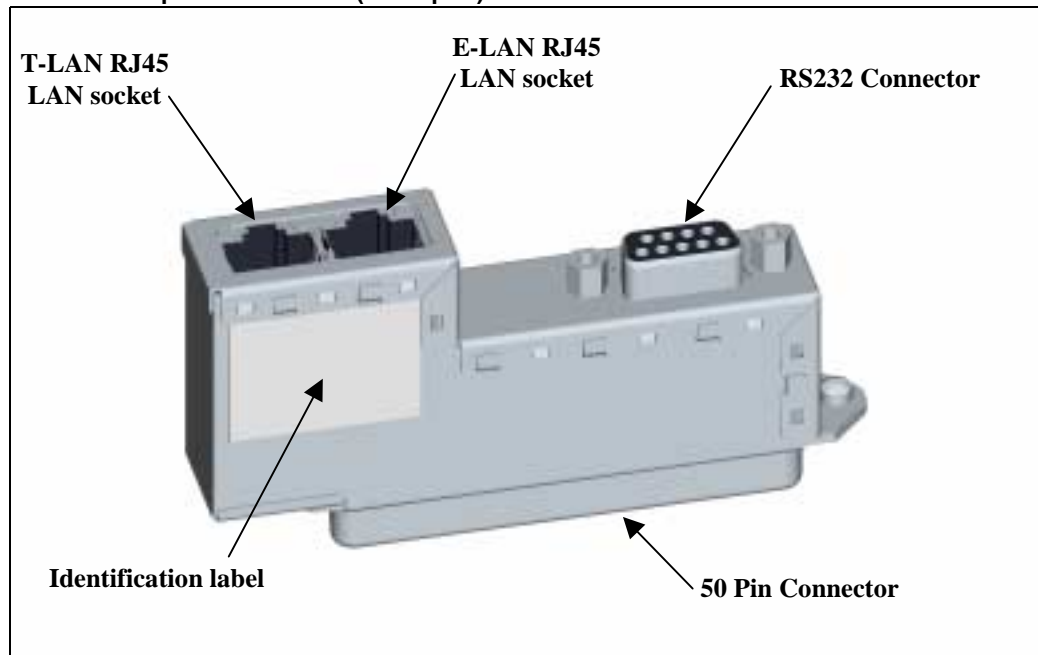
### ITG Card Adapter ELAN/TLAN (L-Adapter)

The adapter breaks out the signals from the I/O connector on small and large systems to the following:

- Ethernet management port (ELAN)
- telephony port (TLAN)
- one RS232 port.

On large systems, the NT8D81AA cable is used to bring all 24 Tip and Ring pairs to the I/O panel. The NTCW84JA I/O panel mounting block must be installed on large systems before the ITG Card Adapter ELAN/TLAN (L-Adapter) is installed. Refer to Figure 4 on page 14.

**Figure 4**  
**ITG Card Adapter ELAN/TLAN (L-Adapter)**



To ensure proper connection, install the adapter securely; otherwise, connectivity could be lost.

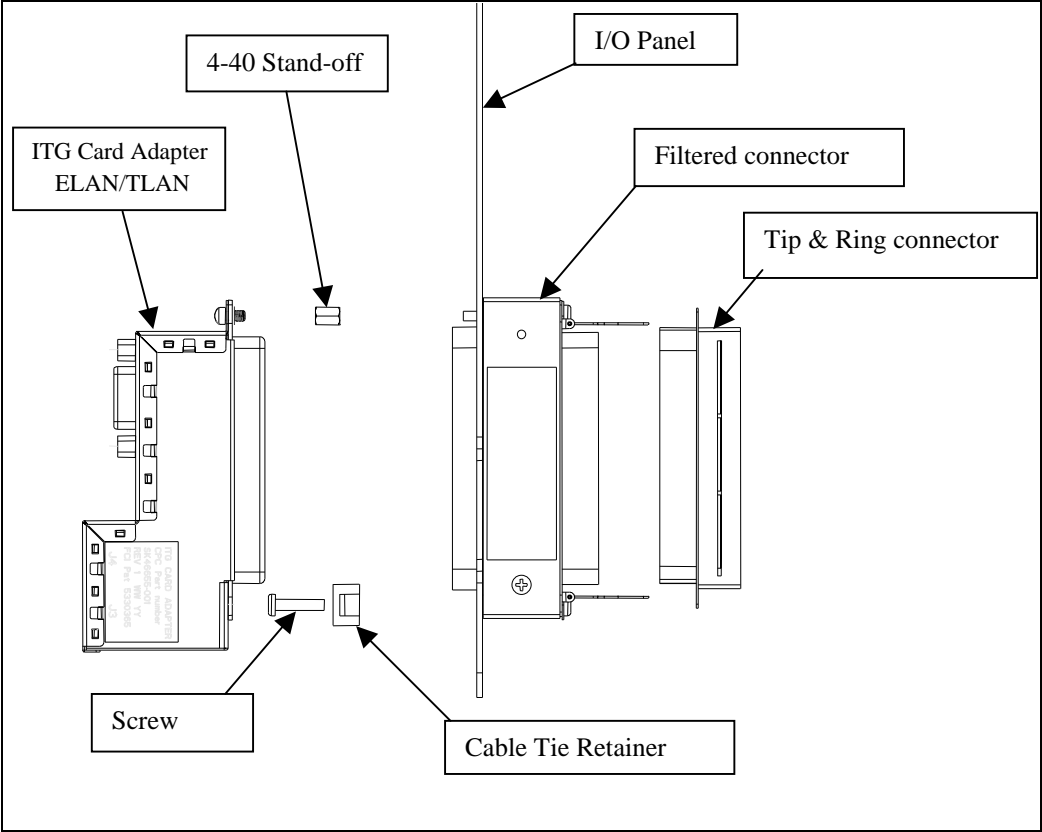
Figure 5 on page 16 shows the adapter installed in a large system with a securing screw and tie-wrap as shown in Figure 6 on page 17.

To install an adapter in a small system, use a securing screw and cable bar. To install an adapter in an Option 11C Mini system, use a securing screw and hook and loop tape. Refer to Figure 7 on page 18.

**Note 1:** When ITG Trunk 2.1 cards are used to replace ITG Trunk 2.0 cards, the existing NTMF94EA or NTCW84KA cabling can be retained but with restrictions on cable length as described in *Meridian Integrated IP Telephony Gateway (ITG) Trunk 2.0 ISDN Signaling/24 Port: Description, Installation, and Operation* (553-3001-202).

**Note 2:** Also note that the D-CHIP connection on the NTCW84KA cable does not function with the ITG Trunk 2.1 card. To connect the D-CHIP where the NTCW84KA cable is being retained, follow the instructions in this Addendum for the ITG Trunk 2.1 card.

Figure 5  
ITG Card Adapter ELAN/TLAN (large system)

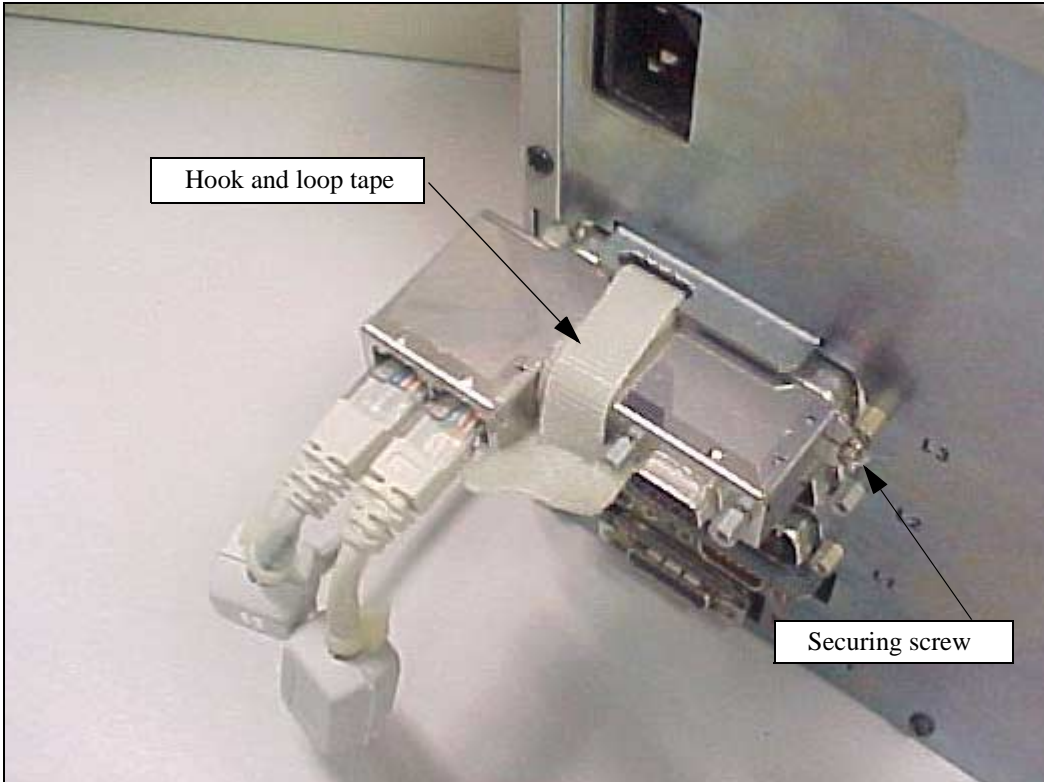




**Figure 6**  
**ITG Card Adapter ELAN/TLAN fitted to Option 11C Cabinet**



**Figure 7**  
**ITG Card Adapter ELAN/TLAN fitted to Option 11C Mini Cabinet**



## **RS232 maintenance port**

The RS232 maintenance port provides access to the ITG 2.1 Trunk command prompt for monitoring and maintenance purposes such as upgrades and debugging. This port is available at the 9-pin connector on the ITG Card Adapter ELAN/TLAN and also at the mini-DIN socket on the faceplate. The serial port settings are 9600 baud, 8 data bits, 1 stop bit, no parity, and no flow control.

## NTMF29BA D-CHIP cable

The NTMF29BA D-CHIP cable connects to port 0 of the D-CHIP PC Card and the MSDL/SDI D-CHIP cable.

*Note:* Port 1 on the D-CHIP PCMCIA card is not used.

The D-CHIP PC card installation which connects to NTMF04BA and NTND26AA Cable is keyed to allow insertion only in the correct direction. Refer to Figure 8 on page 20.

To assemble the D-CHIP cable, follow the steps in Procedure 2 on page 19.

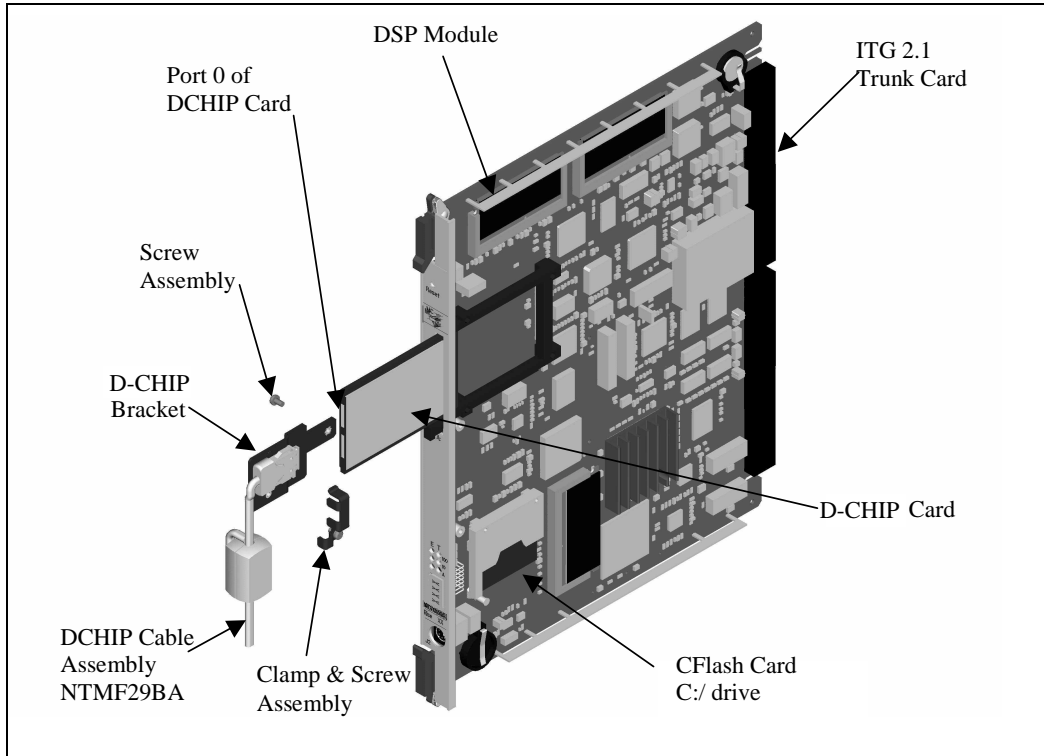
### Procedure 2

#### D-CHIP cable assembly

- 1 Insert the D-CHIP bracket through the small slot to the left of the PC Card opening in the faceplate, as shown in Figure 8 on page 20.
- 2 Fit the screw through the secondary side of the ITG Trunk 2.1 card into the threaded hole in the bracket and tighten.
- 3 Fit the D-CHIP PC Card NTMF29 through the faceplate slot and push it home into the header.
- 4 Fit the D-CHIP PC Card connector of cable assembly NTMF29 into Port 0 (the upper socket) on the D-CHIP card.
- 5 Fit the clamp over the PCMCIA connector and into the bracket. Ensure that the cable is fitted through the clamp, then secure it to the bracket with the attached screw.
- 6 Make sure the eject button protrudes when the card is fully inserted. Do not use excessive force when inserting the D-CHIP PC Card.

————— *End of Procedure* —————

**Figure 8**  
**NTMF29BA PCMCIA D-CHIP Cable Installation**



## **D-CHIP Cable Routing – Large Systems**

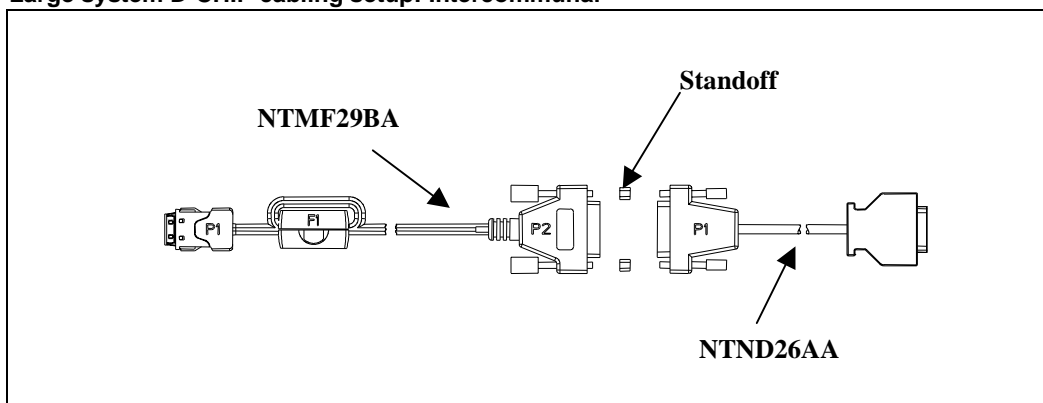
### **NTMF29BA/NTND26AA cable routing**

The NTND26AA cable from the MSDL forms a direct flying lead connection to the NTMF29BA cable from the D-CHIP card. The cables must be routed internally to the system along the cabling channels as shown in Figure 8 on page 20. The NTND26 cable is available in various lengths.

### NTMF04BA MSDL extension cable

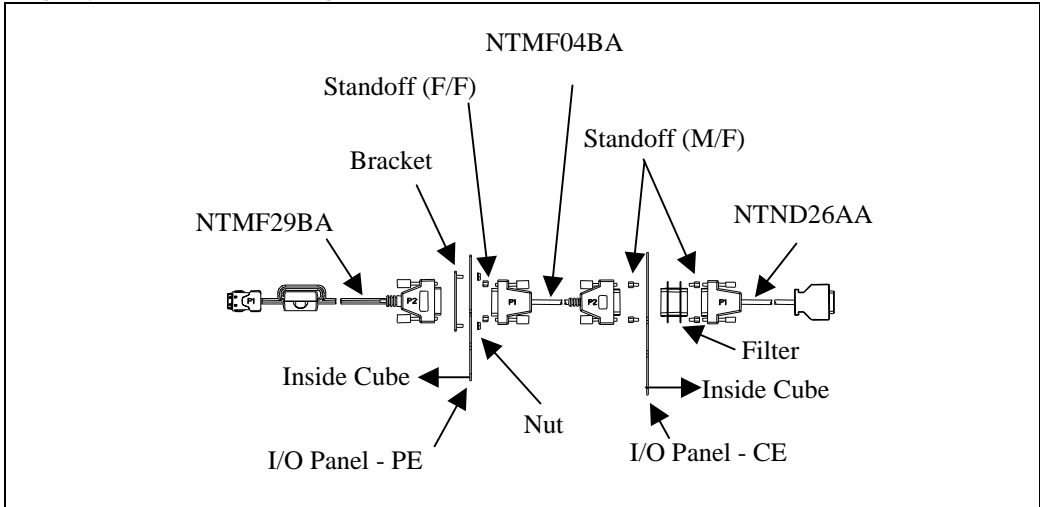
The NTMF04BA cable connects the NTND26AA MSDL cable and the NTMF29BA D-CHIP cable, when the Common Equipment shelf and the IPE shelf are in separate columns and not connected by internal cabling channels. A 15-way mounting block (A03511331) is shipped with the NTMF04BA cable which, when mounted on the Common Equipment shelf I/O panel, allows the connection of the NTND26AA and the NTMF04BA cables. The NTMF04BA cable is then routed externally to the IPE I/O panel to connect with the NTMF29BA D-CHIP. Refer to Figure 10 on page 22.

**Figure 9**  
**Large system D-CHIP cabling setup: Intercommunal**



When the Universal Equipment Modules (UEM) are stacked vertically, or the UEM columns are bolted together, they are cabled in an intercom configuration. See Figure 10 on page 22. This applies when the OEMs system columns are physically separated and the D-CHIP must exit the systems through the I/O panel.

**Figure 10**  
**Large system D-CHIP cabling setup: Intercom**



## D-CHIP Cable Routing – Option 11C

The following cables are specific to the Option 11C. Cable connection details are shown in Figure 11 on page 23.

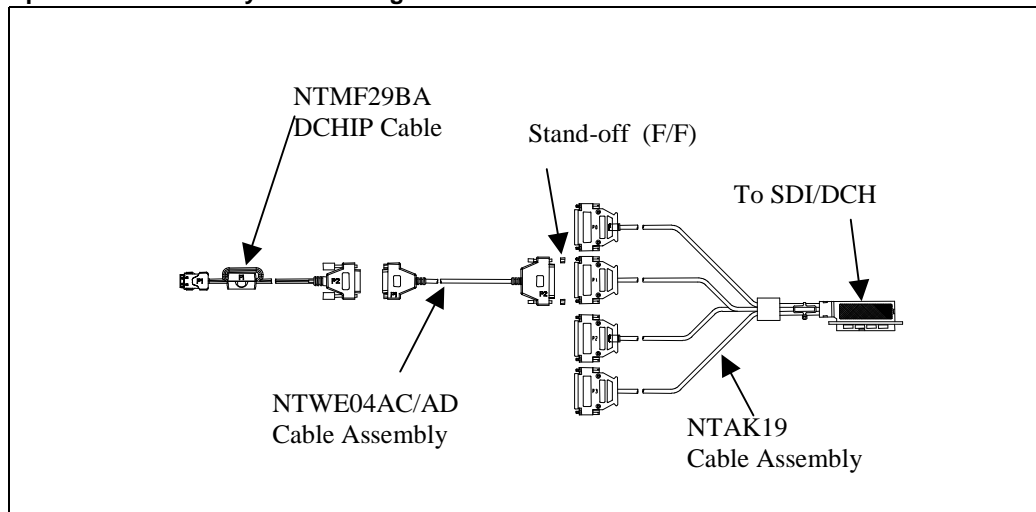
### NTWE04AC/AD SDI/DCH Option 11C Extension Cable

The NTWE04AC and the NTWE04AD are 10 ft. and 1 ft. D-CHIP extension cables respectively. They connect between port 1 or port 3 of the D-CHIP SDI/DCH cable used on Option 11C (NTAK19BA or equivalent) and the D-CHIP NTMF29Bx face plate cable.

### NTAK19BA Four Port SDI/DCH Cable

This cable is an Option 11C MDF cable for interfacing to the 4-port NTAK02 SDI/DCH card.

**Figure 11**  
**Option 11C D-CHIP system cabling**



## Other components

For large systems, I/O panel 50-pin filtered adapters NTCW84JA are required for 100BaseT TLAN operation.

ITG Products use the ITG Card adapter ELAN/TLAN to route Ethernet signals through the Meridian 1 system I/O panel and through system filtering. For standard 10BaseT operation this inherent filtering in the system does not pose a functional concern.

For 100BaseT Ethernet links, the Meridian 1 filtering does impact functionality and special consideration has been given to the routing of the TLAN Tip and Ring pairs. On Option 11C, some of the Tip and Ring pairs have been left free of filtering and the TLAN has been routed on the ITG Trunk 2.1 card to take advantage of this. By default, 100BaseT operation is fully functional on Option 11C.

ITG EMC shielding kit NTVQ83 must be installed with small and large system types. Refer to “ELAN and TLAN interfaces” on page 12 for additional information on the cabling requirements.

## Connecting the ITG Trunk 2.1 card to a modem

To provide remote access to the CLI for support and remote maintenance, you can connect a modem to the serial port of the ITG Trunk 2.1 card. To set up a working interface:

- 1 Use a standard serial cable and establish communication with the modem from a PC with the following settings:

9600 baud, 8 data bits, 1 stop bit, no parity and no flow control

- 2 Ensure that a Hayes compatible modem is used. From the command line, type the following:

AT <return>

- 3 When the OK prompt appears, enter the required settings from Table 2 on page 24:

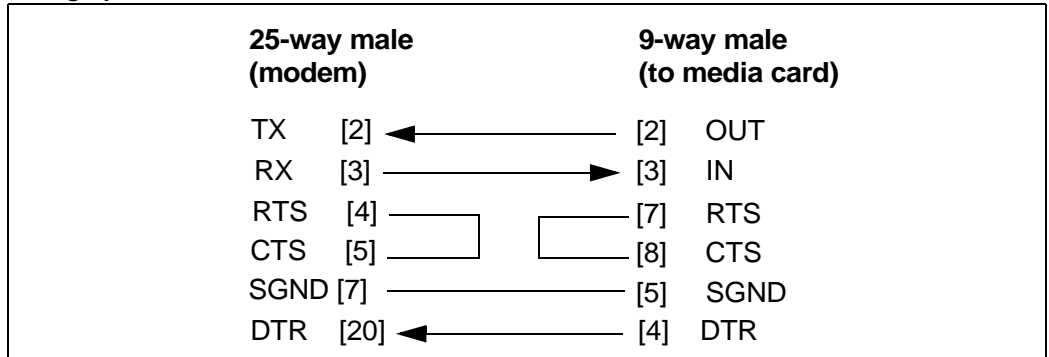
**Table 2**  
**Modem Settings**

Setting	Action
<b>ATS0=1</b> <return>	set to auto-answer on first ring
<b>ATQ1</b> <return>	disable result codes
<b>ATE0</b> <return>	disable local echo
<b>AT&amp;W0</b> <return>	save settings

- 4 Connect the modem to the ITG Trunk 2.1 card, using the 9-pin connector on the ITG Card Adapter ELAN/TLAN (L-adapter) or the legacy ITG cable. The interface cable must conform to the wiring specifications listed in Figure 12 on page 25 for compatibility with existing ITG modem connections.



**Figure 12**  
**Wiring Specifications**



## Subnet configuration for TLAN and ELAN ports

**Note:** Single subnet configuration as described in the NTP implies the configuration and use of just one Ethernet interface, the ELAN interface, over which all voice and management traffic is routed. The single subnet configuration is not recommended for the ITG Trunk 2.1 card or the 24 port ITG Trunk 2.0 card.

Separate or dual subnet configuration implies the configuration of both the TLAN and ELAN interfaces. All management traffic is routed over the ELAN, while all telephony traffic is routed over the TLAN. The ELAN connection is to a 10BaseT hub or switch while the TLAN can be connected to a 10/100BaseT hub or switch.

For dual subnet configuration, make sure the TLAN and ELAN subnets do not overlap. For example, the following configuration is not valid, as the TLAN and ELAN subnets overlap.

ELAN IP	10.0.0.136
ELAN GW	10.0.0.129
ELAN Subnet Mask	255.255.255.224
TLAN Node IP	10.0.0.56
TLAN Card IP	10.0.0.57
TLAN GW	10.0.0.1
TLAN Subnet Mask	255.255.255.0.

The ELAN range of addresses – 10.0.0.129 to 10.0.0.160 - is overlapping with the TLAN range of addresses – 10.0.0.1 to 10.0.0.255. This contravenes the IP addressing practices, as it is equally valid to route the IP packets over either interface and the resulting behavior from such a setup is undetermined.

The overlapping IP address scheme must be corrected when adding an ITG Trunk 2.1 card to an existing ITG Trunk 2.x node that comprises 24 port ITG Trunk 2.0 cards and 8 port ITG Trunk 2.0 cards.

The IP addresses can be split as follows.

ELAN IP	10.0.0.136
ELAN GW	10.0.0.129
ELAN Subnet Mask	255.255.255.224
TLAN Node IP	10.0.0.56
TLAN Card IP	10.0.0.57
TLAN GW	10.0.0.1
TLAN Subnet Mask	255.255.255.128.

The TLAN has a range of addresses from 10.0.0.1 to 10.0.0.127 while the ELAN is in a separate subnet of 10.0.0.129 to 10.0.0.160. This can result in a smaller subnet for the TLAN addresses but it fulfills the requirement that the network is engineered to ensure that subnets do not overlap.

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# Appendix A: Hex Display Codes

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**Table 3**  
**Hex Display Codes (Part 1 of 2)**

Code	Description
T:00	Initialisation
T:01	Testing internal RAM
T:02	Testing ALU
T:03	Testing address modes
T:04	Testing watchdog
T:05	Testing 8051 co-processor
T:06	Testing timers
T:07	Testing external RAM
T:08	Testing dongle
T:09	Programming timeswitch FPGA
T:10	Programming ISPDI FPGA
T:11	Testing host dual port RAM
T:12	Testing DS-30 dual port RAM

**Table 3**  
**Hex Display Codes (Part 2 of 2)**

Code	Description
T:13	Testing SEEPROM
T:14	Booting Host processor, waiting for response with selftest information
T:15	Not used at present
T:16	Not used at present
T:17	Not used at present
T:18	Not used at present
T:19	Not used at present
T:20	Waiting for application start-up message from Host processor
T:21	CardLAN enabled, waiting for request configuration message
T:22	CardLAN operational, A07 enabled, display now under host control

If the internal RAM test, ALU test, address mode test, boot ROM test, timer test, or external RAM test fails, the pack goes into a maintenance loop as no further processing is possible.

If a test fails, “F:XX” shows on the hex display for three seconds after the “T:13” message, with the number represented by “XX” indicating the test that failed. For example, if the 8051 co-processor test failed, “F:05” shows. If more than one test fails, the message indicates the first failure.

In addition, if the IXP encounters any failures during its initialization, an H:XX error code displays. The list of error codes is as follows:

**Table 4**  
**List of error codes**

Code	Description
H:00	Host Processor not booting
H:01	SDRAM test failure
H:02	SRAM test failure
H:04	PCMCIA device failure
H:08	Network interface failure
H:10	Meridian 1 interface failure
H:20	DSP interface failure
H:40	NVRAM/EEPROM interface failure
H:80	PCM connector failure

If the hardware selftests pass and the application starts up successfully, the screen cycles through the following display codes to indicate the function and status of the card.

**Table 5**  
**Display codes to indicate the function and status**

Display Code	Description
ITGT	Application family
V232	Release
M.xx	Minor release
LDR/BLDR/FLR	Pack role: leader/follower
IXXX	Error messages

***Note:*** For the initial application on the ITG Trunk 2.1 card, the codes below apply. As new applications are ported to the platform, the application family or sub-family change

## Echo Canceller Tail Lengths

The EC Tail Length options are either the maximum supported value or OFF. The intermediate values are supported primarily for troubleshooting purposes. Turn the Echo canceller off to avoid potential speech quality issues. Speech quality issues can occur when calls are tandemed to a PSTN connection which is already equipped with an external echo canceller on the PBX side.

**Note:** When OTM 1.1 is used, ITG Trunk 2.1 defaults to a 128ms echo canceller tail length. This setting must not be changed without first contacting Nortel Networks Support. The following commands have been added to the ITG 2.1 shell to override or reinstate the use of this default value.

- **ectailNonDefault** specifies that the OTM 1.0 values must be used
- **ectailDefault** specifies a tail length of 128ms

Both commands are used without additional parameters and they remain in effect after a reboot. The Trunk card must be re-enabled for these changes to take effect.

Refer to Table 6 on page 32 for the Echo Canceller Tail Lengths and Table 7 on page 32 for the packet sizes.

**Table 6**  
**Echo Canceller Tail Lengths**

Designation	Platform	No. of Slots	Port Density				Echo Canceller
			<b>G.711</b>	<b>G.729</b>	<b>G.729A</b>	<b>G.723.1</b>	
ITG 2.8.24	486	2	8	4	8	8	8/16
ITG 2.8.25	486	2	8	4	8	8	8/16
ITG 2.24.24	Pentium	2	24	16	24	24	8/16/24/32
ITG 2.24.25	Pentium	2	24	0	24	24	32/64/128
ITG 2.32.25	Media Card	1	32	0	32	0	32/64/128

**Table 7**  
**Packet Sizes**

Port Density	Packet Size
G.711	10 to 80 in steps of 10
G.729	10 to 80 in steps of 10
G.729	10 to 80 in steps of 10
G.723.1	30



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## Appendix B: ITG Hardware/application line-up

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**Table 8**  
**ITG Hardware/application line-up**

ITG Version	Hardware platform	Number of Ports	Note
1.0	ITG-486	8	ITG 1.0 No ISL function.
2.0	ITG-486	8	ITG1.0 upgrade to ITG 2.0 with ISL function.
2.0	ITG-P (Pentium)	24	ITG2.0
2.1	MC (Media Card)	32	ITG2.1



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## Appendix C: New CLI commands.

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The following are new Command Line Interface (CLI) commands supported by both the ITG Trunk 2.1 and ITG Trunk 2.0 applications:

- **ectailDefault** - set ITG to use the Default 128ms Echo Cancellor Tail-length. See section on Echo Cancellor Tail Lengths above.
- **ectailNonDefault** - set ITG to use the Echo Cancellor Tail-length Specified in the OTM File. See section on Echo Cancellor Tail Lengths above.
- **dspFatalErrorCountShow** - details the number of fatal errors per DSP since last boot-up.
- **dspFatalErrorCountClear** - <DSP num> Clears the fatal error count for the DSP, and returns the DSP to service.

*Note:* Regarding the following commands (rtpPortCompress and rtpPortNonCompress): some routers have the ability to perform header compression on RTP packets which can result in BWidth savings across the WAN. This header compression is only provided by the router if the packet is a valid RTP packet and if the destination IP Socket is within the port range 16384 upwards.

- **rtpPortCompress** - set RTP packets to originated from ports 17300 to 17350 RTP Header Compression Range.
- **rtpPortNonCompress** - set RTP packets to originate from ports 2300 (Default)



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# Appendix D: Corrections to ITG Trunk 2.0/ISDN Signalling Link NTP (Doc# 553-3001-202)

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## Correction #1 to Engineering Guidelines

### ELAN and TLAN half or full duplex operation

The ELAN on ITG Trunk 2.1 and ITG Trunk 2.0 operates at Half Duplex only and is limited to 10BaseT operation due to filtering on the Meridian1 back planes.

The TLAN on ITG Trunk 2.1 and ITG Trunk 2.0 operates on Half Duplex or Full Duplex and can run at 10BaseT or 100BaseT.

It is recommended that any network equipment connected to ELAN or TLAN be set to Auto Negotiate for correct operation.

This supersedes the statement in the *Meridian Integrated IP Telephony Gateway (ITG) Trunk 2.0 ISDN Signaling/24 Port: Description, Installation, and Operation* (553-3001-202) section 'General LAN and WAN engineering considerations'.

## How to avoid system interruption

### Duplex mismatch

Duplex mismatches can occur in the LAN environment when one side is set to autonegotiate and the other is hard configured. The autonegotiate side adapts to the fixed side settings, including speed. For duplex operations, the autonegotiate side sets itself to Half Duplex mode. If the forced side is Full duplex, there will be a duplex mismatch.

To hard configure all devices for speed/duplex, make sure every device and port is correctly set in order to avoid duplex mismatch problems.

### I/O filter connector

The other major TLAN operation problem arises from the standard I/O filter connector in IPE modules on Meridian 51C/61C/81/81C systems.

Use the following guidelines to avoid system interruption, stemming from the standard I/O filter connector in IPE modules,

- Make sure that the standard IPE module I/O filter is replaced with the provided Media Card/ITG-specific filter connector that removes filtering from pairs 23 and 24.
- Do not install the Media Card/ITG-specific filter connector on top of the standard IPE module I/O filter connector.
- Replace the IPE module backplane I/O ribbon cable assemblies with those that have interchangeable I/O filter connectors.
- The TLAN UTP cabling must meet the UTP CAT5 termination and impedance uniformity standards.
- The TLAN UTP cabling must not exceed 50 meters for the ITG-P card.

The TLAN interface can autonegotiate to 100BaseTX full-duplex. To ensure that the TLAN can be used for VoIP:

- Install the Media Card/ITG-specific filter connector correctly by replacing the standard IPE Module I/O filter connector.
- Order new IPE Module Backplane I/O ribbon cable assemblies that have interchangeable I/O filter connectors if it becomes necessary to use one of the IPE Modules with molded-on I/O filter connectors.
- Ensure that the TLAN UTP cabling is CAT5 compliant.
- Always keep the TLAN UTP cabling to less than 50 meters for the ITG-P card.
- As an interim measure, connect to each ITG-P Trunk or Line card and log in to the ITG> or ITGL> shell.

Use the commands to configure the TLAN interface to operate at 10BaseT, half-duplex.

**Note:** If the TLAN to operate at 10BaseT full-duplex the TLAN Ethernet switch port must also be configured to operate at full-duplex. If this is not done a duplex mismatch is created. Packets are lost if the TLAN Ethernet switch port is unchanged from auto-negotiate or mistakenly configured for half-duplex.

## **Correction #2**

### **ITG Trunk 2.0 - Incorrect procedure for BackUp Leader installation in ITG Trunk 2.0/ISDN NTP (Standard 1.00)**

#### **Procedure 3**

##### **Install a BackUp Leader with ITG 2.0 cards**

- 1      Ensure both cards are running the same version of software. This is done by logging into the cards. The software version is displayed.
- 2      If the software versions are different, follow the upgrade erase procedure. Downloaded the software from [www.nortelnetworks.com](http://www.nortelnetworks.com) home page. If problems are encountered, please contact your support group or GNTS.
- 3      Ensure the D-channel is configured to handle the extra B-channels That are installed. ISLM = 382 max.
- 4      Use NTMF94 cables for ITG Trunk 2.0 cards, which have a D-CHIP card installed. For ITG Trunk 2.0 cards which do not have a D-CHIP card installed, use NTCW84 cables.
- 5      In MAT/OTM, in the same Node as Leader 0, configure Leader 1. Make sure the correct MAC/Management and voice addresses assigned for the backup leader are used, and add it. The Management addresses must be in the same subnet for all cards. Though on a different subnet than the management addresses, voice addresses must also be on the same subnet. The MAC address used must always be for the motherboard and is printed on the front of the card.
- 6      If the card (Leader1) has been configured previously, perform the Clear Leader command at the ITG interface. This reboots the card as a follower/BLDR. It is not necessary to use the SET LEADER command at any time.
- 7      Disable Leader 0 and Leader 1 from the Meridian interface. Disable the card in the software to ensure it is disabled even if the LED on the card is lit.
- 8      From MAT/OTM, transmit the NODE/CARD/Dialling Plan to the active leader and all disabled cards. This action is successful to Leader 0, but fails to Leader 1, as it does not yet have an IP address.
- 9      Remove Leader 1 from the M1 backplane.
- 10     Reboot Leader 0.
- 11     When Leader 0 is fully rebooted, push Leader 1 back into position.

- 12 Leader 1 sends a BootP request to Leader 0. Leader 0 then sends a message back to Leader 1 which containing Leader 1's IP address. Leader 1 reboots itself. Leader 1 then comes back as a BLDR. Depending on the network and configuration, Leader 1 can reboot itself up to 3 times.
- 13 Enable the Leader 0 in the M1 interface.
- 14 Transmit the Card/Dialling plan (not Node properties) to Leader 1 from MAT or OTM. Reboot Leader 1 again.
- 15 When fully rebooted, enable Leader 1. If D-channel messaging is enabled, all the channels associated with this card give a Restart message.
- 16 All channels are IDLE on the LDR and BLDR in the system.
- 17 If both cards becoming the LDR, then a network problem has occurred, as BLDR is not receiving/responding to a PING message. To verify, connect the TLAN of both cards to a basic hub and reboot the card. The card must be BLDR. The LDR pings from the Node IP address on the TLAN to BLDR almost continuously. The Link light is continuously lit on the front of the card. The traffic light blinks when the Ping message is sent (with no other traffic active on the cards). The lights on the front of an ITG card represent the state of the TLAN.

----- *End of Procedure* -----



# Appendix E: Environmental and electrical regulatory data

## Environmental specifications

Table 9 below shows measurements of performance under test conditions of temperature and shock.

**Table 9**  
**ITG temperature and humidity specifications**

Specification	Minimum	Maximum
<b>Normal operation</b>		
Recommended	15° C	30° C
Relative humidity	10%	55% (non-condensing)
Absolute (less than 72 hours)	0° C	45° C
Relative humidity	5%	95% (non-condensing)
Rate of change	Less than 1° C per three minutes	
Temperature cycling	0° C to 65° C, 1° C/min., three cycles	
<b>Storage</b>		
Recommended	-50° C	+70° C
Relative humidity	0%	95% (non-condensing)
<b>Temperature shock</b>		
In three minutes	-50°	25° C
In three minutes	70° C	25° C

# Electrical regulatory standards

## Safety

Table 10 provides a list of safety regulations met by the ITG Trunk 2.1 card (a SELV (Secondary Extra Low Voltage) card in any Meridian 1 system, along with the type of regulation and the country/region covered by each regulation.

**Table 10**  
**Safety regulations**

Regulation Identifier	Regulatory Agency
c(CSA)us 950	Safety for Canada, UL 1950 Safety, United States, CALA
EN 60950	Safety, Europe
AS3260, TS001	Safety Australia
JATE Network/Safety	Japan
IEC 60950-CB report including country deviations	

## Electro-Magnetic Compatibility (EMC)

Electro-magnetic emissions regulations met by the ITG Trunk 2.1 card, along with the country’s standard that lists each regulation, are listed in Table 11 on page 43 and Table 12 on page 44.

**Note:** There are no limitations on the number of ITG Trunk 2.1 cards that can be installed in any Meridian 1 system, with the one exception. The number of ITG Trunk 2.1 cards that can be installed in an IPE Cube (large system) for Class B compliance (EN55022:1998 and EN55024:1998) is limited to 10. There are no limitations for Class A installations.

**Table 11**  
**Electro-magnetic emissions regulations - Electro-Magnetic Emissions**

Regulation Identifier	Regulatory Agency
FCC part 15 Class A	United States Radiated Emissions
CSA C108.8	Industry Canada IEC-003 Canada Radiated Emissions
EN50081-1	European Community Generic Emission Standard
EN55022/CISPR 22 CLASS A/B	Radiated Emissions (Basic Std.)
AS/NZS 3548	EMC (Australia/New Zealand)

**Table 12**  
**Electro-magnetic emissions regulations - Electro-Magnetic Immunity**

Regulation Identifier	Regulatory Agency
EN55024	Class B I/O conducted noise
EN61000-4-2 (level 4)	ESD (Basic Standard)
EN61000-4-3 (level 2)	Radiated Immunity (Basic Standard)
EN61000-4-2 (level 3)	Fast transient/Burst Immunity (Basic Standard)
EN61000-4-5 (level 4, preliminary)	Surge Immunity (Basic Standard)
EN61000-4-6 (preliminary)	Conducted Disturbances (Basic Standard)
EN6100-4-11	Dips, Interruptions (system level)
EN61000-3-2	Harmonics & Flickers (system level)